STT-MRAM applications use in IBM FCMs

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NEWM-202B-1: MRAM (New Memory Technologies Track)

Introducing The IBM FlashCore Module

IBM **FlashCore™** technology delivers key differentiators

- Built in, performance neutral **hardware compression** and **encryption**
- Using **64 layer 3DTLC NAND**
- Enterprise data **reliability**
- Cognitive Algorithms for **Wear Levelling, Health binning, Heat segregation** and media management
- Intelligent media management that **keeps settings ideal** to keep performance consistent.
- **Endurance** without latency penalty
- **FIPS 140** certification

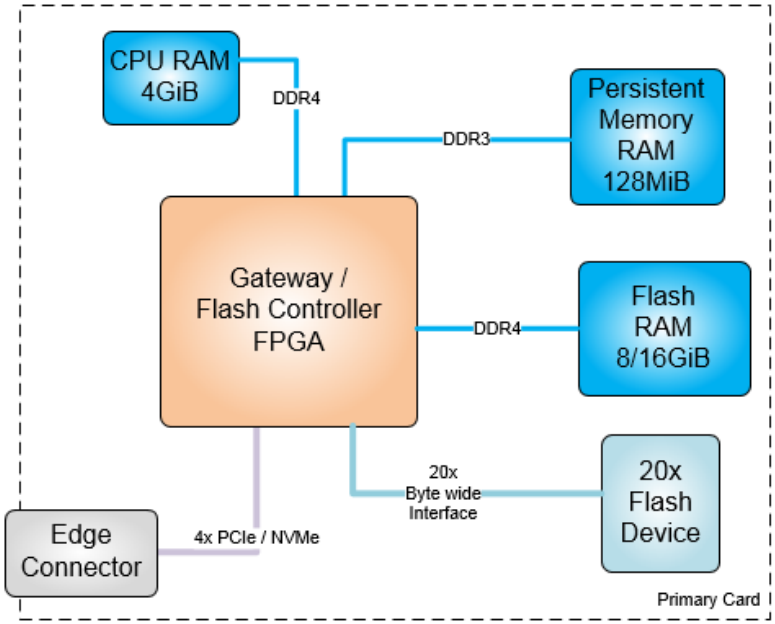
4.8TBu, 9.6TBu, 19.2TBu capacity options with up to 3:1 compression

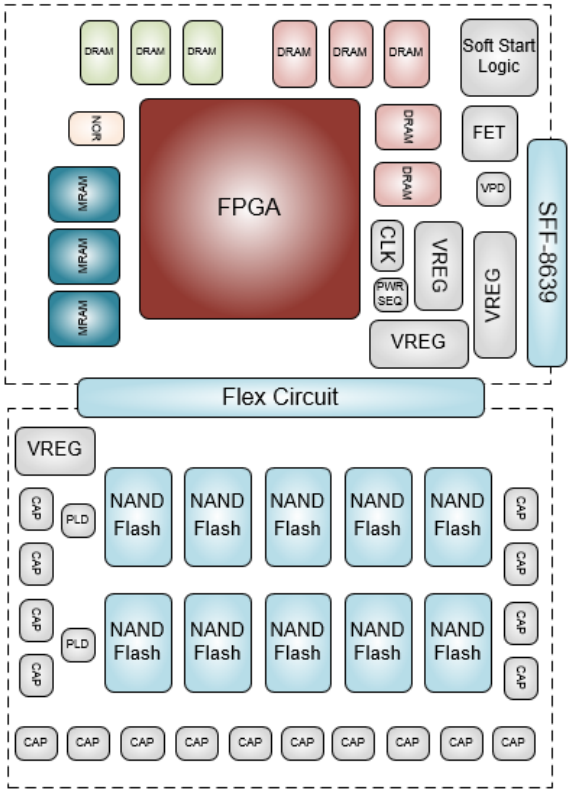
FCMs Implement Everspin's STT-MRAM

- Technology BER and Endurance meets FCM design requirements
  - Component level qualification approved and validated by IBM component teams
- Meets performance requirements with persistence
  - Solves the power loss use case and data retention requirements

Flash Memory Summit

FCM Design – Block Diagram / Floorplan





ST-MRAM Persistent Memory Use Case
Power Loss Protection – IBM FCMs

- Write Cache / Data Buffer
  - Multi-levels for heat segregation / data streams
- Journaling Checkpoint
- RMW Buffer
- Persistent Memory Region
- State Dumps
- Trace Logs
- Stats

ST-MRAM Persistent Memory Use Case Advantages for IBM FCMs

- Speed of MRAM allows for direct use as a write cache / data buffer
  - No requirement to destage on power loss to NAND
- Allowed for simplifications of some design points
  - Don't need to use NAND space for data checkpoints, journals and logs. Can all be stored in MRAM
- Allows for ease of implementation of PMR
  - No requirement for building a journal or destage function for PMR, can reside directly in MRAM